Keypoints Chapter 21 Generation of Biochemical Energy

Definitions

You will not be asked to write a definition of any of these but I do expect you to recognized them when they are used in problems, etc..

Anabolism

ADP/ATP

Acetyl CoA

Catabolism

Coenzyme A

Coupled Reactions

Cell Membrane

Citric Acid Cycle

Electron Transport

$FAD/FADH_2$

Mitochondria

Mitochondrion

$NAD^+/NADH$

Organelle

Oxidation/Reduction

Oxidized/Reduced

Oxidizing Agent/Reducing Agent

Redox Reaction

Concepts

1. Be able to explain how unfavorable reactions can appear to occur in organisms.
2. Be able to explain why are reactions in the Citric Acid Cycle and Electron Transport coupled reactions?
3. Be able to explain how multiple membrane folds in mitochodria aid in ATP production.
4. Be able to identify the part of the cell where nearly all of the ATP production takes place.
5. Be able to describe the role of FAD and NAD+ have in the Citric Acid Cycle and in Electron Transport.

6. Be able to state what processes in the body produce the Acetyl-S-CoA used in the Citric Acid Cycle.
7. Be able to explain how coenzymes are cycled in the Citric Acid Cycle and Electron Tranport. (FAD/FADH2, NAD+/NADH, ADP/ATP)
8. Be able to explain how the fact that mitochodria have an inner and outer membranes is important in Electron Transport.
9. Be able to give the source of energy liberation Electron Transport, and what this energy is used for..
10. Be able to recognize the types of inhibition that are used in the Citric Acid Cycle.
11. Be able to recognize the types of activation that are used in the Citric Acid Cycle.
12. Be able to describe differences and similarities between NADH and that of $FADH_2$. in relation to Electron Transport (Where are the two located? Do they have the same role? Do they interact with the same proteins and coenzymes in Electron Transport?)
13. Be able to name the type of reaction is associated with most of the controlled energy metabolism in the Citric Acid Cycle.
14. Be able to name the type of reaction that drives Electron Transport.
15. Be able to give the net reactants and products of Electron Transport.
16. Be able to compare the Citric Acid Cycle and Electron Transport. (Where does the energy come from? Where is it stored in each? Which produces more ATP equivalents? Which produces products used in the other?
17. Be able to predict if 2 coupled reactions produce a reaction that is favorable overall when given the free energy change associated with each reaction.
18. When given a diagram of the Citric Acid Cycle be able to identify the steps that involve oxidation reactions, decarboxylation reactions, or hydration reactions.
19. Be able to describe why an organism needs to release the energy from the oxidation of glucose in a series of steps rather than all at once.
20. Be able to give the role of ATP in organisms.
21. Be able to describe where in Electron Transport water is formed and whether or nor not this is a redox process.

Calculations

1. When given the free energy change assosicated with a reaction in one direction be able to determine the free energy change associated with the reaction in the reverse direction.
2. When given the free energy of 2 reactions be able to give the free energy change that will occur if these reactions are coupled.